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EMBRYOLOGY.[1]

OBSERVATIONS ON THE DEVELOPMENT OF CEPHALOPODS.[2]—In this memoir Mr. S. Watase deals very fully with the origin of the cells which give rise to the yolk membrane. With the exception of Lankester, all authorities agree in describing the "yolk membrane" as originating from the segmentation of the original germinal disk. As to the origin of the digestive tract, Kölliker and Bruce describe the digestive tract as continuous with the "yolk membrane." Balfour and Lankester derive the "mesenteron" from the lower layer of the mesoderm; Metschinikoff derives the major part of it from the ectoderm, while Ussow traces the whole digestive tract to the ectodermic involutions.

Mr. Watase's conclusions are as follows in regard to these points: (1) The "yolk membrane" is derived from the original germ disk; (2) it makes its appearance underneath the marginal zone of the germ disk, near to the junction of the intermediate zone; (3) the cells of the "yolk membrane" are irregular in outline, fusiform in cross-section, amœboid in movement, each with one or more large nuclei; (4) with the growing edge of the blastoderm the underlying "yolk membrane" keeps pace in growth with the spreading germ disk, but never coming outside of the peripheral zone; (5) the "yolk membrane" grows at the same time from the margin to the centre of the disk, and in time it comes to completely separate the blastodisk from the yolk mass beneath it; (6) the blastodisk at about this stage is a hollow hemisphere placed at one pole of the yolk mass, and with the origin of the "yolk membrane" cells underneath the marginal zone, which grow centripetally underneath the blastodisk, presents a phenomenon comparable in all respects to the epibolic gastrula; (7) hence Mr. Watase believes the "yolk membrane" to be necessarily a true endoderm, and its sole representative in the Cephalopods; (8) as to the origin of the digestive tract, with its appendages, he found it to be formed by the ectodermic invaginations, that is, by prolongations of the proctodæum and stomodæum; (9) at no period of the development does there exist any connection between the "yolk membrane" and the digestive tract, and long before the absorption of the food yolk is completed the permanent digestive canal is formed; (10) with the absorption of the food yolk the "yolk membrane" disappears. The yolk membrane is therefore a provisional structure the function of which is, like that of the periblast or merocytes in fish ova, for the purpose of appropriating the yolk substance. Two admirably drawn colored plates illustrate Mr. Watase's memoir.

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[1] Edited by Prof. John A. Ryder, Univ. of Penna., Philadelphia.

[2] Studies from the Biological Laboratory of Johns Hopkins University. Vol. IV., No. 4, pp. 163-181. June, 1888.

DEVELOPMENT OF THE SEA-BASS (*Serranus atrarius*).—During the early part of the month of July last, in the laboratories of the U. S. Fish Commission, at Wood's Holl, Mass., the writer had the opportunity to study the development of this form. The eggs are of the floating or pelagic type, and very transparent, measuring very nearly 1 millimetre in diameter. The buoyancy of the egg is no doubt increased by the presence of a moderately large oil drop which is embedded in the yolk, near its periphery, and at the pole nearly opposite the point where the blastoderm is formed. Hatching occurs at the end of the third day, and the oil drop is pushed toward the cephalic end of the yolk, as the latter is nearly absorbed.

The embryos when hatched present much the appearance of the young Tautog or Mackerel, as respects their transparency, but they soon have their pigment spots arranged in a peculiar way along the edges of the median fin folds. Later, the arrangement of the pigment cells is somewhat different and more irregular, while a second kind of pale yellow pigment cells appear, forming three pretty well-defined transverse bands, at equidistant intervals, across the body and tail of the young fish.

ON THE DEVELOPMENT OF THE CALCAREOUS PLATES OF ASTERIAS,[1] is the title of a beautifully illustrated memoir by J. Walter Fewkes on the later history of the young star-fish, which, together with the memoir by Mr. A. Agassiz, makes our knowledge of the development of these echinoderms very complete. Five fine plates illustrate the paper.

VALUES IN CLASSIFICATION OF THE STAGES OF GROWTH AND DECLINE, WITH PROPOSITIONS FOR A NEW NOMENCLATURE.—Under this title, Prof. A. Hyatt discusses the values of larval and growth characters, introducing a number of new terms.[2]

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[1] Bulletin of the Mus. Comp. Zoology, Harvard College. XVII., No. 1, July, 1888. (Studies from the Newport Marine Laboratory.)

[2] Proc. Boston Society of Nat. History. XXIII., 1888, pp. 396–407.